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DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

January 19, 1976

Joshua Lederberg, M.D.  
Professor of Genetics  
Stanford University School of Medicine  
Stanford, California 94305

Dear Dr. Lederberg:

I was delighted to receive your December 16 letter and have been doing a considerable amount of work on some specific material to send back to you. I have to do this work in my spare time in the midst of a heavy administrative schedule at my regular job and it is not quite complete.

This letter is an interim reply stimulated in part because I wanted to call your attention to the conference on capturing the sun through bioconversion which is scheduled to take place here in Washington March 10 to 12. I am enclosing several copies of the brochure which describes this conference. I thought that you and/or some of the WHO people with whom you are working would be interested in knowing about this conference and perhaps attending since composting will come up as one of the topics for discussion.

Meantime, let me say that I am not surprised that you discovered the kinds of attitudes and problems that you recount in your December 16 letter. Using FAO data and looking at the quantities of nitrogen that are present in human and animal excreta, I have come up with the interesting conclusion that there are about 70 million tons of nitrogen in these materials compared to a total output of 40 million tons used as chemical fertilizer in the world's annual chemical fertilizer production. Projecting the human population to 7 billion in the year 2000, and assuming only a one-half increase in the present animal population, the organic matter that will be produced at that time will contain about 100 million tons of nitrogen. This material is certainly crucial to maintaining and improving yields per acre on crop lands. It seems to me altogether possible that a deterioration of the calorie-protein nutrition of the human race (as the food supply falls behind and population increases over the next 25 years) may become the most important single health risk that the human race will face during the rest of this century. I think that any fears that virus or

bacterial pathogens are not adequately destroyed and can create a serious health problem if they are incorporated into agricultural soils, pales into insignificance compared to the probable danger of nutritional deterioration. Indeed, I have noted that there has been little or no epidemiological evidence that the Chinese have suffered from bacterial diseases from organisms that have been incorporated into the soil. I am sure that the transmission cycles have always taken place at much earlier stages of direct person-to-person contact or by getting into water supplies. Therefore, while we should keep our eye on the virus problem and the fact that some viral particles are not destroyed in the composting processes, it should not seriously deter us from trying to get composted materials incorporated into active agricultural soils. I think that in filtration, and biological recycling and disarming, the soil seems to be our best medium for breaking the cycle of such pathogenic organisms.

I will be sending you more material that specifically bears on these matters shortly.

Sincerely yours,

A handwritten signature in cursive script, reading "Gerald F. Winfield".

Gerald F. Winfield  
Chief, Manpower and  
Institutions Division  
Office of Population

Enclosures: a/s